

about its Axis," and "On Hamilton's Characteristic Function for a Narrow Beam of Light" Prof. Clerk-Maxwell; "On the Vibrations of a Stretched Uniform Chain of Symmetrical Gyrostats," Sir W. Thomson. The President (Prof. H. J. Smith) contributes papers "On the Higher Singularities of Plane-curves" and "On the Integration of Discontinuous Functions;" Major J. R. Campbell gives an account of "The Diagonal Scale Principle applied to Angular Measurement in the Circular Slide Rule." Shorter papers are "On the Method of Reversion applied to the Transformation of Angles," Rev. C. Taylor (the basis of the communication of which an abstract only is given in the "Proceedings," the full paper being printed in the *Quarterly Journal of Mathematics*, No. 53, is a work on Conic Sections, by G. Walker, 1794); "On some Proposed Forms of Slide Rule," and "On the Mechanical Description of Equipotential Lines," Mr. G. H. Darwin; and "On the Mechanical Description of a Spheroconic" and "a Parallel Motion," by Mr. Hart.

From this enumeration of the contents of the volume before us, it will be seen that its contents range over nearly the whole domain of pure and applied mathematics.

#### LETTERS TO THE EDITOR

*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]*

#### The Government "Vivisection" Bill

ALLOW me supply an omission in the paragraph in last week's NATURE which states that Mr. Cross "pointed out" to the deputation on this subject, "that the Bill was framed practically in accordance with the views of the Royal Commission." This astonishing assertion was of course contradicted at once, but the fact does not appear in the paragraph in question; and, though the discrepancy between the Royal Commission Report and the Government Bill is notorious and acknowledged on all sides, so few people read either the one or the other, that a statement to the contrary may be believed, if allowed to pass. Those who have given attention to the Blue-book in question know that while the evidence on which Legislation was recommended went beyond the facts, the Report beyond the evidence, and the recommendations beyond the Report, the Bill actually introduced by Lord Carnarvon did not so much exceed as contradict the recommendations of the Royal Commissioners. If a reasonable registration Bill in accordance with the Report of their own nominees had been framed by the Government, they would have spared themselves and others a good deal of trouble.

P. H. P. S.

#### The Boomerang

I OBSERVE a letter in NATURE (vol. xiii., p. 168) asking for information about the "boomerang." I have now taken the occasion of a number of the aboriginal natives of this district being here with me for a time, to make inquiries on the subject which might confirm or correct my own previous observations. The information I have gained as to the "boomerang" I now condense, preserving, however, as much as possible the language made use of by my informant. I have also seen the boomerang thrown by one of their best performers, a short account of which I will add in conclusion to this letter.

Two kinds of boomerang are made, one called "marndwullun wunkun," that is the "boomerang," as I may translate the term "wunkun," which turns round; "marndwullun" is equally applied to the returning flight of a bird as to a boomerang. The second kind of boomerang is called "tootgundy wunkun," that is the boomerang which goes straight on, "toot" meaning something "straight" or "erect."

The two boomerangs differ in their construction. The second (straight) kind being thicker, longer, and less curved than the first, I shall call, as a matter of convenience, the "marndwullun" No. 1, and the "tootgundy" No. 2.

With No. 1 there is no certainty of hitting the mark. It may come back too quickly, and may hit your own friends standing

near you. In choosing a boomerang like No. 2, in preference, it will be more sure to hit the object, and will generally penetrate the mark with the point which has been held in the hand. A black fellow will prefer one of the kind No. 2, if required for fighting. That is, he can make more sure of hitting his enemy. With No. 1 he will probably miss or even injure his friends, as it is difficult to tell where it will come back to. If No. 1 strikes an object it will never return; besides, it is generally too light to do much execution. These statements, which I have recorded as nearly as possible as given to me to-day, quite confirm my own observations made during the last twenty years in Victoria, South Australia, New South Wales, the Queensland Back country, and Central Australia. In Cooper's Creek I have seen boomerangs No. 1 used by the natives to kill ducks and birds in general which fly in flocks. They seemed unable to calculate where its course would be among them, and some were hit; the boomerang and the bird both fell. I have often seen these weapons thrown but never saw one return after striking an object. If slightly touching an object in its course, such as the small limb of a tree, it might continue a curve to the ground, but no longer in the same plane as before, and the impetus would be destroyed. A third kind of boomerang is used in Central Australia, as far at least as near to the tropics about the 141st meridian (north of Sturt's Desert), which I think is only used for fighting at close quarters. Speaking from memory this variety is probably about 4 or 5 feet in length and of very heavy wood. I have rarely seen them carried, but have found them concealed near to or lying in the huts of camps from which the natives had fled at my approach. Finally, I have great doubt whether any of the natives can tell beforehand whether a boomerang No. 1 will, when finished, be a good "marndwullun wunkun" or not; and it is not uncommon for an aborigine, if he finds his boomerang to return instead of going straight to its mark, to heat it in the ashes and straighten it, so that the blade lies in one plane.

It may perhaps be not uninteresting to your correspondent if I record an instance or two in which the boomerang has been used in the settlement of quarrels in this district.

I write as follows, using the first person, and as much in the words of my informant as is possible:—

"Once I had a quarrel with one of our Kurni (black fellows). I was angry and called him 'barrat-dun,'<sup>1</sup> He was very cross. I had word from a friend that Daly was going to fight me. I was obliged to go, or be called 'jeeragan' (coward). A number of Kurni who had quarrelled had to fight each other at the same time.

"Our friends decided we were to fight with boomerangs. Both of us had 'tootgundy wunkun.' 'Marndwullan wunkun' would be no use, it is too light, and you can't take sure aim. Our friends stood round to see which was best man, just as I have seen the 'lowan' (white men) do. Daly threw the first boomerang because I had called him 'barrat-dun.' We threw turn and turn about. You can see the boomerangs coming. I dodged them as well as I could or turned them off with the shield. They passed me like a wind. I had a shield. If you turn the boomerangs they slide off. If you stop them they either break your shield or carry it away. One 'wunkun' passed me and stuck three or four inches into a dargan tree (Box—one of the Eucalypts). When the 'wunkuns' were all thrown we went towards each other with the 'culluck,' he put down the 'bamrook' (shield against the boomerangs or spears) and took up the 'turmung' (shield against culluck=club). We had each a 'culluck' and a 'turmung.' We both hit and warded off as I have seen white men do with their big knives (sword). At last Billy the Bull, one of our friends, ran in and cried out, 'moondanna' (that will do, or enough). Then we stopped. We were then friends. Daly said to me, 'Why did you call me that name?' I said, 'I am sorry.' There was no more.

"A few years ago 'Barny' woke up in his camp in the night and saw 'Lamby' standing by his fire. He was frightened, and said, 'What do you want?' Lamby said, 'Only some fire.' But Barny thought he had been 'ngarrat bun' (made sick). Perhaps it was with the 'yertung,' the little leg-bone of the kangaroo. If you point that at a sleeping man and sing a song he will be sick. I don't know the song, I never heard it; it might be, perhaps, beginning, 'Yertung, yertung, goombart, goombart.'<sup>2</sup> If he could do this without being seen the Kurni believe

<sup>1</sup> Barrat = sickness or disease. The whole term implies having acquired a loathsome form of disease, for which the aborigines have to thank the whites.

<sup>2</sup> Goombart is the large leg-bone, and is ground down with a sharp point at each end and worn in a hole through the septum of the nose. It is believed to have magical powers.

the man would become sick and die. I have never seen it done.<sup>1</sup>

Soon after Barny died, News went about that Lamby had killed him. Then went about also 'Laywin a ngangata' (news of war). Word was sent by the dead man's relations to come and fight at some place. It was near the mouth of the Nicholson River at the Lakes. All the Kurni from Bairnsdale to the Snowy River came. The women sat down, beat the 'possum rugs with their hands, and called the other side names for 'ngarrat bun a Kurni' (bewitching or making sick a black fellow). The two brothers of the 'poor fellow' (the term commonly used in speaking English for dead man) threw boomerangs and 'kunnin' (a straight steel pointed at each end and about 2 feet 6 inches to 3 feet in length). Lamby had a shield. At last a 'kunnin' went through his right leg just above his knee. He drew it out behind and threw it back. But he missed, it was too slippery with blood. Then they wanted to throw spears at him, but some 'Kurni' men and women stood up before Lamby, and the fight stopped. Then they were friends. Lamby had two shields (turnmung), one in his hand and one on the ground before him to be ready.<sup>2</sup>

The above narratives will, I think, throw some light on the use of the boomerang, and are characteristic of the customs of the aborigines, which it is much to be regretted are going to oblivion. A careful record of these—in fact a faithful record of the customs, the beliefs, the systems of consanguinity of the Australian aborigines would throw much light on the probable early condition even of the now civilised races. I have for some years treasured

have produced replies, and scarcely more than one per cent. yielded results.

This is, however, a digression, and I now give, as illustrating the two above narratives, slight sketches of the "bamarook," the "turnmung," and the "culluck."

The boomerang throwing to which I have referred took place on the open flat lying between the River Mitchell and its branch known as the Backwater. It was open and well suited for the purpose, but a sea-breeze was blowing. There were present eight black fellows from different localities, extending from the Mitchell River to the Snowy River. Among them was Lamby, the hero of the fight which I have narrated, Toolabar, a brother of the man Barny, and Long Harry, the acknowledged boomerang-thrower of the whole district; so much so that when I suggested that he should be called for the future "Bungil Wunkun," i.e., "He of the Boomerang," the term was received with acclamation, and it is not improbable that for the future this may be his native name. The only boomerang we had was one of the "mardwullun," or returning sort. Throws were made by all, and the defects of the throws as well as of the instrument pointed out by one or the other almost in the same terms. One arm of the boomerang was held to be too much curved for the instrument to return near the thrower. The throws proved this to be the case, as it was evidently impossible for the thrower or the spectators to tell exactly what the course of the missile would be in returning. In some cases it flew past over our heads and fell in the rear, at others flew in the opposite direction far to the front. The explanation of this given me was that it was partly due to the uncertainty of the boomerang's return flight unless of rare perfection in make, and partly due to the wind which affected its course. I found that the throws could be placed in two classes, one in which the boomerang was held when thrown in a plane perpendicular to the horizon, the other in which one plane of the boomerang was inclined to the left of the thrower.

In the first method of throwing, the missile proceeded, revolving with great velocity, in a perpendicular plane for say 100 yards, when it became inclined to the left, travelling from right to left. It then circled upwards, the plane in which it revolved indicating a cone, the apex of which would lie some distance in front of the thrower. When the boomerang in travelling passed round to a point above and somewhat to the right of the thrower, and perhaps 100 feet above the ground, it appeared to become stationary for a moment; I can only use the term *hovering* to describe it. It then commenced to descend, still revolving in the same direction, but the curve followed was reversed, the boomerang travelling from left to right, and the speed rapidly increasing, it flew far to the rear. At high speed a sharp whistling noise could be heard. In the second method, which was shown by "bungil wunkun," and elicited admiring ejaculations of "ko-ki" from the black fellows, the boomerang was thrown in a plane considerably inclined to the left. It then flew forward for say the same distance as before, gradually curving upwards, when it seemed to "soar" up—this is the best term—just as a bird may be seen to circle upwards with extended wings. The boomerang of course was all this time revolving rapidly. It is difficult to estimate the height to which it soared, making, I think, two gyrations; but judging from the height of neighbouring trees on the river bank, which it surmounted, it may have reached 150 feet. It then soared round and round in a decreasing spiral and fell about 100 yards in front of the thrower. This was performed several times. The descending curve passed the thrower, I think, three times. Other throws were spoiled by the wind, which carried the boomerang far to the front. I observed, and some of the aborigines confirmed it, that the thrower preferred throwing with the wind. Another method of throwing was mentioned, namely, to throw the boomerang in such a manner that it would strike the ground with its flat side some distance in front of the thrower. It would then rise upwards in a spiral, returning in the same. This was not attempted as it was decided the boomerang was not strong enough. A final throw in a vertical plane so that the missile struck the ground violently fifty or sixty yards in advance terminated the display. It ricocheted three times with a twanging noise and split along the centre. My black friends said they should soon manufacture a number of the best constructed "wunkun" to show me. I observed that the spectators stood about a hundred yards on one side of the thrower, and when the boomerang in its gyrations approached us every blackfellow had his eyes sharply fixed on it. The fact stated by them that it was dangerous was well shown in one instance, where it suddenly wheeled and flew so close over us that I and Toolabar fell over

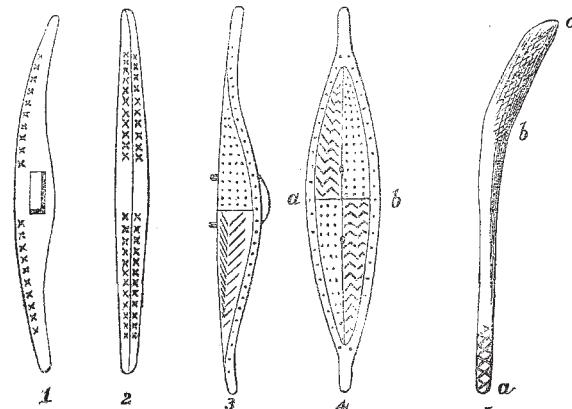


FIG. 1.—Side view of Turnmung; made apparently of stringy bark (*Eucalyptus obliqua*). Height 28 inches, circumference at handle 8 inches, circumference at end 2 inches.

FIG. 2.—Front view of Turnmung.

FIG. 3.—Side view of Bamarook, made apparently of stringy bark wood. Height 29 1/2 inches, width across (Fig. 4) a to b 6 1/2 inches. The slightly convex surface is marked with angular or dotted incised patterns in opposite quarters.

FIG. 4.—Culluck drawn from memory. a to b rounded handle; b to c flattened and somewhat edged along the inside curve.

up for future use everything I could gather on these subjects. This mine of strange information is immense, and I regret to say not only unworked, but I fear destined to remain so—while the aborigines are rapidly fading away before the advancing wave of settlement. To anyone who has not endeavoured to collect such information through others, the utter apathy which exists throughout the Australian colonies may seem inconceivable. I regret to say that sad experience has shown me that it exists. As an instance I may mention that of some 400 or 500 circulars which I have, together with my colleague in the inquiry, the Rev. Mr. Fison, sent out asking for information as to the systems of kinship obtaining, certainly not five per cent.

As an example I may give the snake-charm which is sung to a monotonous chant. The blacks tell me they sing this and suck the wound for snake bite:—

"Yane thay, gaylunga, gaylunga,  
Yane thay, gaylunga, gaylunga,  
Williba, wirreba, wirribiyow"

repeated indefinitely. It may be translated—

"Oh, the jaw of the gaylung, the gaylung,  
Oh, the jaw of the gaylung, the gaylung,  
Go and hide yourself in the bush-rat's nest."

Gaylung is, I believe, a *Hoplocephalus*, and very deadly. It is said to frequent the rats' nests, which are made of grass.

each other in dodging it. The expression used by them was "Marndwullun no good for fight; if he no hit 'em man, might come back and hit your friend beside you." I questioned the black fellows as to whether they thought a boomerang could be thrown so as to return to the hand of the thrower. Seven said "no," and characterised the statement as "jetbollan," i.e. a falsehood; the eighth said he once made a boomerang that when thrown on a calm day with great care would gyrate round and round until it descended to the ground not far from him, moving as slowly as a leaf falling from a tree, and that he once ran forward and nearly caught it. He said also "no Kurni (black fellow) can catch a wunkun when he flying—he would cut his hand open."

All the black fellows were unanimous in stating that a boomerang when it has struck anything ceases its course.

I have now stated all that at present suggests itself as to the boomerang. I fear that I may have trespassed too much on your space and on the patience of your readers.

Bairnsdale, Gippsland, Victoria, ALFRED W. HOWITT  
March 3

#### Fertilisation of Flowers.—The Cuckoo

As a fact interesting in connection with the fertilisation of flowers, I have observed that in *Scabiosa arvensis* the stamens are elongated and the anthers ripened successively—not simultaneously—in each individual floret, the first having fallen off the filament, while the fourth is yet colourless and curled up in the tube of the corolla, the other two being in intermediate stages of development.

May I also state in reference to the Cuckoo, that a rhyme well known in Somersetshire, runs thus:—

"In April, come he will,  
In May, he sings all day,  
In June, he alters his tune,  
In July, he prepares to fly,  
In August, go he must."

By which it is clearly not meant that the Cuckoo ceases to sing in that part of the country at Midsummer. This break of note in June is generally to be noticed about the middle of the month. I, this year, heard it for the first time on the 28th May.

Ealing CHAS. FRED. WHITE

#### The Cuckoo

IN connection with the notes of Mr. Adair and Mr. Joyner in NATURE of July 6th and 13th, let me record that the Cuckoo has not even yet left us in the Midlands. I heard it only last evening near to my own house. There is a popular rhyme, long current in Derbyshire, concerning this bird. One couplet tells us the Cuckoo may be heard

"In April, May, June, and July,  
If she sings any longer she'll tell a story;"

so that even this rude rhyme shows that it is not expected to depart earlier than this month.

LLEWELLYNN JEWITT  
Winster Hall, Derbyshire, July 15

#### ABSTRACT REPORT TO "NATURE" ON EXPERIMENTATION ON ANIMALS FOR THE ADVANCE OF PRACTICAL MEDICINE<sup>1</sup>

##### IV.

#### Experimentation for Determining the best means of Restoring Animation after some Forms of Accidental Death.

THE frequent occurrences of death from the administration of chloroform and other agents of the anaesthetic series led me very early to experiment for the purpose of discovering the best means of restoring life after such accidents. I commenced this research in 1851, and have continued it up to the present time. I consider it to have been one of the most fruitful in useful practical results. The details of the work have been communicated at various times to the world of science, and at considerable length. They formed the subject of a special report to the British Medical Association at its meeting in London in 1862. They formed the subject of a report to the Royal Society in 1865. They were con-

<sup>1</sup> Continued from p. 199.

tinued in the Croonian Lecture delivered before the same Society in 1873, and they were introduced into various lectures on experimental and practical medicine, and into reports on the physiological action of organic chemical compounds made to the British Association for the Advancement of Science.

As the account of these inquiries covers a great deal of ground and brings into light many curious and interesting topics, I shall devote a little extra time to the abstract of the experimentation.

##### Method of Experimental Research.

The mode of experiment in this research has consisted chiefly in testing the action of the narcotic vapours; the vapours of chloroform, ether, nitrous oxide, carbonic acid, choke damp, carbonic oxide, hydrocyanic acid, methyl, chloral hydrate, and others similar. Some inquiries have also been made relative to instant death by mechanical and electrical shocks, and to death by drowning and cold.

In every case the animal has been submitted as painlessly and rapidly as possible to the process which we call death. The rapidity and painlessness were essential to the experimental inquiry; because the more rapidly and the more placidly the animation is suspended, the less is the body exposed to the risk of organic injury.

In the course of observation two steps have been followed.

##### I.

In the first line of inquiry the animals have been allowed to die without any attempt to restore life, the object being to ascertain why death took place. After death the organs of the body have been examined in order to determine what was the action of the destroying agent on them. How did it arrest the living action?

The first question asked had relation to the condition of the lungs:—Were they left bloodless, containing some blood, or congested with blood? The second question had relation to the heart:—Were its cavities left full, or empty of blood; were they distended or collapsed; was the blood left in the cavities of natural or unnatural colour; were the muscular walls of the heart still excitable to motion, or were they quite inactive; if the muscular walls were inactive were they rendered inactive by rigidity of contraction or by relaxation? The third question had relation to the blood:—Had the blood undergone coagulation, and if it had not at the time when the examination was made, how long a time elapsed for the completion of the process? What was the condition of the blood corpuscles; were they scattered or massed together, were they perfect in outline or irregular? What was the colour of the blood on the two sides of the circulation; was the venous blood darker than the arterial, or were the two kinds of blood mixed in respect to colour? Were any gases escaping from the blood or had any escaped? Had the fibrine escaped from the other constituent parts? Had the blood accumulated in any of the vascular organs, or had it exuded from its vessels in whole or in part? The fourth question related to the state of the nervous organs, the brain and spinal cord:—Were these organs congested or free of congestion? Was there any effusion of blood or of serum into them? Was the appearance of the white and grey matter natural or morbid? Were the membranes vascular or pale? The sixth question had relation to the state of the visceral organs in the cavity of the abdomen:—Were the kidneys free of congestion, or were they congested? Was the colour of the intestines natural? Were the liver and spleen congested or free of congestion? The seventh question had regard to the muscular system:—How long a period elapsed before the muscles became spontaneously rigid? After what modes of death from the different agents did the muscles continue most active under the influence of the galvanic current? What sets of muscles first ceased to respond to the current, the muscles of respiration or the muscles of